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How Toddlers' Irritability and Fearfulness Relate to Parenting: A Longitudinal Study  
Conducted Among Quebec Families

### Abstract

Although child difficult temperament is a well-known risk factor for parenting quality, few studies have focused on the association between specific temperament dimensions and parental behaviours. This study focused on negative emotionality, one of the best-accepted dimensions of temperament, and its sub-dimensions of irritability and fearfulness. The aim of the present study was to evaluate the predictive value of irritability and fearfulness at 17 months upon parenting practices (involvement, coercion and overprotection) at 29 months, beyond the influence of other well-known risk factors (e.g., socio-economic status, maternal depression). The study used data from the QLSCD, a longitudinal study conducted upon 1 829 families from Quebec (Canada), using self-report questionnaires and medical files. Structural equation modeling identified irritability as a predictor of coercion, an externally controlling practice, while fearfulness predicted overprotection, an internally controlling practice. No significant associations were found after modeling between dimensions of negative emotionality and involvement. These results underline how certain aspects of child temperament may differentially “pull for control” and lead parents to act in a certain way, which may thwart young children’s development and need for autonomy.

*Keywords:* fearfulness, irritability, controlling parenting, coercion, overprotection

## How Toddlers' Irritability and Fearfulness Relate to Parenting:

### A Longitudinal Study Conducted Among Quebec Families

Associations between child difficult temperament and detrimental parenting, two important predictors of child adjustment, have repeatedly been found in studies of child development (Sanson, Hemphill & Smart, 2004; Therriault, Lemelin, Tarabulsky & Provost, 2011). A body of research suggests that children's characteristics actively influence their parents' behavior (Laukkanen, Ojansuu, Tolvanen, Alatupa and Aunola, 2014; Zadeh, Jenkins and Pepler, 2010). The present study will investigate the association between a core component of difficult temperament, negative emotionality, and parental practices while using a differentiated assessment of both negative emotionality and controlling parenting. In particular, two sub-dimensions of child negative emotionality (i.e., fearfulness and irritability) will be analysed as predictors of parental involvement as well as of two types of controlling parenting practices (i.e., coercion and overprotection).

### **Temperament**

Temperament can be defined as individual differences in reactivity and self-regulation in the motor, attentional and emotional domains (Rothbart & Bates, 2006). Reactivity refers to the intensity of one's reactions toward environmental stimulations and changes, while self-regulation consists in the combination of processes employed by the individual to modulate one's reactivity (Gartstein & Rothbart, 2003; Rothbart, 1988). These genetically based characteristics appear early in the child's life, and though they can be influenced later on by maturation and personal experiences, they are relatively stable (Gartstein & Rothbart, 2003; Rothbart & Bates, 2006).

Although temperament has been defined and conceptualised in many different ways in previous studies, some consensus seems to have been reached regarding three broad dimensions of temperament: surgency, negative emotionality and effortful control (Putnam, Sanson & Rothbart, 2002; Rothbart & Bates, 2006). Negative emotionality, one of the most consistent and well-accepted dimensions since the first temperament studies, is defined by high-intensity negative emotions such as anger, frustration, sadness or fear, as well as high irritability and unsoothability (Paulussen-Hoogeboom, Stams, Hermanns & Peetsma, 2007; Putnam, Sanson & Rothbart, 2002). It is considered to be at the core of the well-known, although much criticized, “difficult temperament” concept, first introduced by Thomas and Chess in the New York Longitudinal Study (Thomas & Chess, 1977). Negative emotionality can be subdivided in dimensions of irritability (distress toward limitations) and fearfulness (distress toward novelty; Putnam et al., 2002; Rothbart & Bates, 2006). Irritable children tend to cry, to protest or to show anger in other ways when they face a conflict with another child or a caregiver (Goldsmith, Rieser-Danner & Briggs, 1991). They are thought to be vulnerable to both internalizing (e.g., anxiety, depression) and externalizing difficulties (e.g., aggression) and lower social competence (e.g., Eisenberg et al. 2001; Frick and Morris, 2004; Lengua, 2003, 2006; Rothbart, Ahadi & Hershey, 1994). As for fearful children, they tend to show behavioral inhibition which is the tendency to withdraw from, avoid, or react fearfully to novel situations (Kagan & Fox, 2006). When the fearful temperament remains stable throughout infancy and into childhood, it has been shown to increase the risk of developing anxiety problems (Chronis-Tuscano et al., 2015).

**Parenting styles**

Based on the existing literature and on their own empirical work, Grolnick and Ryan (1989) have conceptualized parenting styles according to three dimensions: involvement (vs. hostility), provision of structure (vs. permissiveness) and autonomy support (vs. controlling parenting). This classification, or similar ones such as Barber's (1996) or Gray and Steinberg's (1999), has been used in a number of subsequent studies (e.g., Joussemet et al., 2008; Kerr, Stattin & Özdemir, 2012; Wouters, Doumen, Germeijs, Colpin, & Verschueren, 2013).

When parents are involved, they are affectionate, accepting, interested in and knowledgeable of their children's lives. They are also responsive toward their children's needs and demands (Gray & Steinberg, 1999; Grolnick, 2003; Grolnick & Ryan, 1989). Providing structure consists of establishing rules and limits, formulating clear demands, monitoring and following through with logical consequences when limits are transgressed (Barber, 1996; Grolnick, 2003). Finally, parents can actively support their children's autonomy by communicating empathy, offering them opportunities to make age-appropriate choices and decisions, and helping them explore their own values and interests (Grolnick & Ryan, 1989; Soenens & Vansteenkiste, 2005). Controlling parenting, on the other hand, reflects a parental desire of limiting and discouraging their child's autonomous behaviours, therefore making them feel like they are forced to think, feel or be in certain ways (Soenens & Vansteenkiste, 2010). While externally controlling parenting involves the use of external contingencies to exert pressure, such as punishment threats, internally controlling parenting activates internal pressures within the child with more subtle and insidious techniques such as guilt induction and conditional parental love

(Soenens & Vansteenkiste, 2010; Soenens, Vansteenkiste & Sierens, 2009). The present study will examine the influence of children's negative emotionality on parental involvement, on coercion, an externally controlling parenting practice, and on overprotection, an internally controlling practice. Coercion involves the use of force or parental authority to ensure obedience, with no regards to children's needs or opinions, and without explaining rationales behind rules or requests (Soenens et al., 2007). Overprotection is defined as excessive physical or social contact, prolonged and exaggerated infantilization and depreciation of autonomous behaviours (Thomasgard & Metz, 1993). These techniques oppress children and encourage them to remain dependent on their parents (Soenens et al., 2009; Thomasgard & Metz, 1993, 1997).

### **Non-optimal parenting practices**

Even when parents wish for their child's psychological well-being and individuality and can identify practices that would be optimal for their child's development, it doesn't guarantee that this knowledge will always be carried out (Grolnick, 2003; Kohn, 1998). Grolnick (2003) has hypothesized that pressure upon parents might lead them to employ poorer parenting practices. This pressure can come, for example, from the context (pressure from above; e.g., stress at work, financial strains; Grolnick, 2003) or from the parent him- or herself (pressure from within; e.g., values, beliefs, unrealistic expectations; Grolnick, 2003). However, the pressure can also come from the child's characteristics (pressure from below; Grolnick, 2003). Child temperament, at large, as well as child negative emotionality in particular, can pressure parents and lead them to resort to non-optimal child-rearing practices. For example, in an observational study, mothers were more likely to be power assertive when interacting

with difficult children (Clark, Kochanska and Ready, 2000). The present study aims to explore how two dimensions of temperament exert a different form of pressure upon parents, therefore eliciting different types of parenting practices.

### **Associations between negative emotionality and parenting**

Numerous studies have investigated the relations between child negative emotionality and parenting, mostly upon mother-child dyads. Irritability has been found to have a negative impact on parental involvement and structure. For example, Van den Boom and Hoeksma (1994) have noticed that irritable children were less stimulated by their mothers and received less physical and visual contact, while Ciciolla, Crnic and West (2013) have observed that mothers of anger prone children showed less sensitivity during a free play session. It may be that irritable children tend to provoke difficult interactions with parents which would lead them to withdraw affection (Lengua, 2006). Other authors have argued that children's irritability has a detrimental impact on parents' responsiveness toward their needs (Crockenberg & Smith, 1982; Therriault et al., 2011; Van den Boom & Hoeksma, 1994) and on their capability of being consistent while applying disciplinary measures (Lengua, 2006; Lengua & Kovacs, 2005). However, irritability's greatest impact seems to be upon controlling parenting (Calkins, Hungerford & Dedmon, 2004; Lee & Bates, 1985). It has been hypothesized that irritable children may be more likely to direct angry and oppositional behaviors toward parents, which would prompt them to try to control their children's affects and behaviors in a more negative, intrusive and coercive way (Kiff, Lengua & Zalewski, 2011). Parents could also resolve to use coercive practices to enforce compliance in irritable children as it has been found that they are less likely to be cooperative with their parents than non-irritable

children (Kochanska, Aksan & Carlson, 2005). Mothers of irritable children have indeed reported using more coercive practices than those of easier children (Bridgett et al., 2009). Recently, Laukkanen and colleagues (2014) have shown that amongst first graders, children's tendency to show intense negativity and to be difficult to soothe was associated with more psychological control from parents, which refers mostly to internally controlling practices, but not exclusively (Soenens and Vansteenkiste, 2010).

As for fearfulness, it has been found to have a positive impact on parental involvement. Van Bakel and Riksen-Walraven (2002) have noticed that fearful children received better parental support, while Lengua and Kovacs (2005) have found that shy children reported higher acceptance from their parents. Despite these positive associations, it has been observed that parents of fearful children resort more frequently to internally controlling practices, specifically by being less supportive of their child's manifestations of independence (Rubin, Nelson, Hastings & Asendorpf, 1999), by encouraging their child's withdrawn behaviour (Belsky, Rha & Park, 2000) and by being overprotective (Coplan, Prakash, O'Neil & Armer, 2004; Coplan, Reichel & Rowan, 2009). Hudson and Rapee (2005) found that when parents have more than one child, they tend to be overprotective only towards their anxious children, suggesting the role that fearful temperament may play in eliciting overprotective parenting. Kiel and Buss (2011) also found that a fearful temperament was related to protective parenting, even more so when mothers were accurate when anticipating their toddlers' fearfulness. It may be that in the face of emotions like fear and anxiety, parents of fearful children are inclined to try to protect and soothe them (Lengua, 2006), sometimes resulting in warmer parenting, and sometimes resulting in more internally controlling practices.



Even though a number of studies have investigated the relations between children's negative emotionality and parenting practices, these studies usually focus solely on one dimension of negative emotionality (most frequently irritability) or on one aspect of parenting. Because irritability and fearfulness are posited to stem from different neurological systems and that they tend to relate to different child adjustment outcomes, it is advisable to study each of their respective influence on each parenting dimension (Kiff et al., 2011). Indeed, different studies suggest that they have unique contributions in predicting parenting practices (Lengua & Kovacs, 2005; Kiff et al., 2011). The present study aims to build on this prior work and investigate, within a representative sample, the relative strength of association between two dimensions of negative emotionality (irritability and fearfulness) with three parenting variables, namely involvement and two types of controlling parenting, coercion and overprotection. Furthermore, we will take into account a number of important factors that might influence the relation between negative emotionality and parenting, such as children's sex, rank of birth and birth/neonatal complications in addition to the family's socio-economic status (SES) and the level of maternal depression. All of these factors have been linked with lower parenting quality. The impact of premature birth or other neonatal health problems (e.g., Forcada-Guex, Pierrehumert, Borghini, Moessinger & Muller-Niz, 2006; Thomasgard & Metz, 1997; Udry-Jorgensen et al., 2011), maternal depression (e.g., Lovejoy, Graczyk, O'Hare & Neuman, 2000) and familial SES (e.g., Evans, 2004; Grolnick, 2003; Rafferty & Griffin, 2010) are well-established, and there is some evidence that both mothers and fathers tend to be harsher toward boys (Keller & Zach, 2002; Soenens, Vansteenkiste & Luyten, 2010; Bezirgianian & Cohen, 1992) and that infants with multiple older siblings

receive less attention from parents (Falbo & Polit, 1986; Keller & Zach, 2002).

Moreover, all of these potential covariates can increase parents' experience of pressure and therefore have a potentially detrimental effect on their parenting practices. Parental stress has been shown to be positively associated to overprotective parenting (Mullins et al, 2007) and to increase the use of harsh and punitive practices (Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000).

### **Hypotheses**

The aim of this study was to investigate the prospective relations between two dimensions of negative emotionality (i.e., irritability and fearfulness) of 17 months-old toddlers and their mothers' parenting behaviors (i.e., involvement, coercion, overprotection) one year later, at 29 months-old, while taking into account a number of potential risk factors for detrimental parenting (i.e., being a boy, having a high birth rank in the family, neonatal health problems, maternal depression, having a low SES).

In the light of previous studies, we expected fearfulness to be positively correlated with involvement and overprotection. In addition, we predicted that irritability would be negatively associated with involvement and positively associated with coercion.

The data analyzed for this study were collected as part of the Quebec Longitudinal Study of Child Development (QLSCD), conducted by the Institut de la statistique du Québec from 1998 to present date. The purpose of this longitudinal study was to gain a better understanding of children's development and to identify the factors that influence their social adjustment. To do so, hundreds of variables have been measured (e.g., sociodemographic information, lifestyle and health habits, family functioning, child characteristics, etc.).

## **Method**

### **Participants**

The QLSCD sample was initially composed of 2 940 Quebec families who had welcomed a newborn between October 1997 and July 1998, selected so as to be representative of the global newborn population with regards to child sex (51.2% male and 48.8% female) and inhabited region,(i.e., the sample is stratified so the proportion of infants from one region is the same as in the global population of Quebec). Every region of the province is represented, except Nord-du-Québec, the Cree and Inuit territories, and the Indian reserves. Only children from single births and full-term pregnancies were retained. Families were randomly selected according to their addresses through the Master Birth Register, which keeps a record of every birth in the province. All respondents were invited to fill consent forms at every follow-up, and each family received a financial compensation of 20\$ annually for their participation in the study.

Of the 2 940 families initially selected, 2 223 accepted to participate to the study. Reasons for exclusion included the inability to locate or get in touch with the families, refusal, target child death, and parents speaking neither French nor English. The attrition rate for this study is low, as 92.8% of the 2 223 families completed the first phase of the study until 2002. Most parents (63.1% of mothers and 61.3% of fathers) were between 25 and 34 years-old at the target-child's birth and living in a nuclear family (80%), as compared to blended (10.8%) or single-parent (9.2%) families. The target-child was the first-born of the family in 41.7% of the sample, while 58.3% already had a sibling at birth. While a majority of families were composed of two Canadian-born parents (80%),

7% of the parental couples were “mixed”, with one of the parent’s having an immigrant status, while both parents had that status in 13% of the families.

### **Procedure**

The data were collected through self-administered questionnaires filled out by both parents, as well as through annual interviews, conducted with the person who best knows the child (i.e., the biological mother in 99% of the sample). These meetings of one hour forty-five minutes took place at the child’s residence. The first measures were taken when the children were approximately five months of age (i.e.,  $4,5 \pm 0.6$  months). The subsequent measures were collected at one year intervals, at ages 17 months and 29 months ( $\pm 1$  month).

### **Measures and questionnaires**

**Child negative emotionality (father reports).** The data relative to both fearfulness and irritability were collected through self-administered questionnaires answered by fathers when their child was 17 months old. The items were taken from the Infant Characteristics Questionnaire (Bates, Freeland & Lounsbury, 1979; Institut de la statistique du Québec, 2002) and were previously validated upon a sample of 572 families of Quebec during an earlier, preliminary study (Santé Québec, Jetté, Desrosiers & Tremblay, 1997). Four items measured fearfulness (e.g., “How does your child typically respond to a new person?”, “How well does your child adapt to new experiences (such as new playthings, new foods, new persons, etc.) eventually?”;  $\alpha = .70$ ) and six items measured the child’s irritability (e.g., “How easy is it for you to calm or soothe your child when he or she is upset?”, “How many times per day, on average, does your child get fussy and irritable for either short or long periods of time?”;  $\alpha = .80$ ). All items

were rated on Likert-type scales ranging from 1 to 7, and global scores ranging from 0 to 10 were computed. For both scales, one point was subtracted to all measures so as to obtain a minimum of zero. For the fearfulness scale, the mean was calculated for all fathers who had responded to at least three of the four items, then multiplied by the number of items (i.e., four) and rounded off to the closest whole number. For the irritability scale, the mean was calculated for fathers who had responded to at least four of the six items and was multiplied by six before being rounded off to the closest whole number. The resulting scores, ranging from 0 to 24 for the fearfulness scale and from 0 to 36 for the irritability scale, were then proportionally brought back to a scale ranging from 0 to 10.

Although data for both parents' perception of child negative emotionality were available at 17-months, father-reports were preferred to mother-reports or aggregate reports so as to reduce as much as possible the risks of an illusory correlation resulting from the use of self-report measures from the same respondent for both the predictor and criterion variable (i.e., common method variance; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Moreover, previous studies have found moderate to high correlations between mother and father assessment of their child's temperament, whether measured with the ICQ or the Infant Behavior Questionnaire, which is based upon Rothbart's theory of temperament and includes negative affectivity as one of its core factors (Bates, Freeland & Lounsbury, 1979; Gartstein & Rothbart, 2003). Positive correlations were also found between mother and father reports of their 17-month old child's irritability ( $r = .470, p < .001$ ) and fearfulness ( $r = .428, p < .001$ ) in the QLSCD.

**Parenting (mother reports).** Data relative to involvement and coercion were collected through a computerized questionnaire completed by the interviewer during structured interviews with mothers, when children were 29 months old. Items for these scales were taken from the Parent Practices Scale (PPS; Strayhorn & Weidman, 1988) and were previously used in the National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada & Development of Human Resources Canada, 1995). Both the involvement and coercion scales have since been used in a number of studies upon infants and toddlers and have been associated as expected with outcomes such as anxiety (Laurin, Joussemet, Tremblay & Boivin, 2015), physical aggression and prosocial behaviour (Girard, Pingault, Falissard, Boivin, Dionne & Tremblay, 2014; Romano, Tremblay, Boulerice & Swisher, 2005) and behavioural and emotional problems (Meunier, Bisceglia & Jenkins, 2012). Involvement measured participation and pleasure in the parent-child relationship, with three items (e.g., “In the past 12 months, how often did you and your child talk or play with each other, focussing attention on each other for five minutes or more, just for fun?”, “In the past 12 months, how often did you play sports activities, hobbies or games with your child?”;  $\alpha = .63$ ). All items were rated on Likert-type scales, and global scores were obtained by calculating the mean of the scale’s items and ranged from 1 to 5. Coercion referred to power-assertive behaviors, (8 items, e.g., “In the past 12 months, how often did you tell your child that he/she was bad or not as good as others?”, “In the past 12 months, when your child broke the rules or did things that he/she was not supposed to do, how often did you use physical punishment?”,  $\alpha = .68$ ). The items were rated on Likert-type scales ranging from 1 to 5 and global scores were ranging from 0 to 10 were computed. One point was subtracted to all items so as to

obtain a minimum score of zero, before calculating the mean and multiplying it by the number of items on the scale and rounding it off to the closest whole number. This score was then proportionally brought back on a scale from 0 to 10.

Overprotection measured an insecure and possessive style (4 items, “I can never bring myself to leave my child with a baby-sitter”, “I insist upon keeping my child close to me at all times, within my eyesight and in the same room as I”,  $\alpha = .74$ ). Data on parental overprotection were obtained through a self-administered questionnaire completed by mothers, also when the children were 29 months old. All items were elaborated for the QLSCD and submitted to a panel of experts in mother-child interactions to verify content validity, before being pretested during the Quebec Study of Newborn Twins in 1995 and the QLSCD preliminary study. All items were scored on Likert-type scales ranging from 0 to 10 and global scores were derived from the mean for respondents who had completed at least two of the four items.

**Covariates.** Five covariates, which are all putative risk factors for detrimental parenting, were included in the analyses. The data relative to the child’s sex and birth rank were obtained in the Master Birth Register. The highest possible birth rank score was 5. If the actual birth rank was higher, the assigned score was 5.

The score for neonatal health problems, which reflects children’s health condition at birth, was obtained through medical records. The overall scores vary from 0 to 26 and consist of the weighted sum of children’s health problems known to predict later health and development. Each health problem was weighed according to its severity and risk for the child’s further development. Higher scores on this scale indicate poorer health conditions, at risk of compromising the child’s development. This measure of neonatal

health risk indicator has also been used in a number of previous studies (Laurin et al., 2015; Nikiéma, Zunzunegui, Séguin, Gauvin & Potvin, 2008; Séguin, Potvin, Zunzunegui & Frohlich, 2003).

The score for maternal depression was derived from questions included in the computerized interview and the self-administered questionnaire, both administered when the child was 5 months old (13 items, “How often have you felt or behaved this way during the past week: I felt depressed; I felt that everything I did was an effort”,  $\alpha = .81$ ). Twelve items were taken from the Centre for Epidemiologic Studies - Depression Scale (Radloff, 1977) and one item originally from the Edinburgh Postnatal Depression Scale (Cox, Holden & Sagovsky, 1987) was added to the scale, which slightly improves its reliability (i.e.,  $\alpha_{12\text{items}} = .75$ ). Other studies have also used this modified version of the scale (e.g., Geoffroy et al., 2010; Geoffroy et al., 2012). All items were scored on Likert-type scales ranging from 1 to 4. Global scores were computed by first subtracting one point to all measures so as to obtain scores ranging from 0 to 3, calculating the mean for all mothers who had responded to at least 8 items, multiplying it by the number of items and rounding it off to the closest whole number. The obtained score was then proportionally brought back on a scale ranging from 0 to 10.

Finally, the SES score was assigned to families when children were 5 months old. This score was computed from both parents’ instruction level and occupational prestige and family income, which were assessed through self-report questionnaires filled by the parents. The scores were standardized to obtain a mean score of 0 with a standard deviation of 1. This conceptualization of socioeconomic status was initially elaborated for the NLSCY (Statistics Canada & Development of Human Resources Canada, 1995).



### **Analytic strategy**

The hypothesized model was tested using path analysis with maximum likelihood estimations in Mplus version 7 (Muthén & Muthén, 1998-2007). Mothers' self-reported parenting practices at 29 months (i.e., involvement, coercion, overprotection) were regressed on father-reported negative emotionality dimensions at 17 months (i.e., fearfulness and irritability) and on other putative risk factors (i.e., child sex, birth rank, neonatal health problems, maternal depression, SES).

As suggested by Hu and Bentler (1999), we compared different parameters to assess the path model fit: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error Approximation (RMSEA), the Standardized Root Square Mean Residual (SRMR) and the chi-square ( $\chi^2$ ). A value of .08 or less for the SRMR (Hu & Bentler, 1999) and of .06 or less for the RMSEA (Hu & Bentler, 1999; MacCallum, Browne & Sugawara, 1996) are considered an adequate fit. A value of .95 and above for the CFI and TLI is considered an excellent fit, and the  $\chi^2$  should not be significant (Bentler & Bonett, 1980).

## **Results**

### **Descriptive statistics and bivariate correlations**

Descriptive statistics (means, standard deviations) and bivariate correlations of the studied variables are presented in Table 1. In addition to being the first step in the exploration of our research hypotheses concerning the relations between temperament and parenting, bivariate correlations have allowed us to detect other interesting relations. First, regarding the relation between child temperament and parenting practices, we found a positive association between fearfulness and both coercion and overprotection, as

well as a marginal negative association with involvement. As for irritability, it was found to be positively associated to coercion. We also observed a significant positive correlation between the two measures of negative emotionality, fearfulness and irritability. As for the parenting measures, involvement was negatively related to coercion and overprotection, and both measures of controlling parenting (coercion and overprotection) were positively associated to one another.

The other significant relations point to the contribution of other child, mother and familial factors to parenting quality. Maternal depression and SES were both significantly correlated to all three parenting scales measured in this study. Maternal depression was negatively associated with involvement and positively associated with coercion and overprotection, while the family's SES was positively associated with involvement and negatively associated with both controlling practices. Being a boy was associated to higher levels of parental coercion, while a higher birth rank was related to less involvement. Finally, a high score on the neonatal health problems scale was associated to higher levels of overprotection.

### **Structural equation modeling**

We then tested our SEM model to verify the relations between child negative emotionality and parenting dimensions. All three forms of parenting practices were regressed on both forms of negative emotionality. All the putative covariates were included in the final model as each of them was significantly associated with some or all of the parenting variables (see Figure 2 in Supplementary material for correlation coefficients between covariates and variables of interest). Maternal depression and SES were included as predictors for all three parenting variables, neonatal health problems as

a predictor for involvement and overprotection, birth rank as a predictor for involvement, and child sex as a predictor for coercion. The model and the standardized coefficients, after controlling for covariates, are illustrated in Figure 1.

The CFI of this model was of .998 and the TLI was of .996, while the  $\chi^2$  was non-significant ( $\chi^2_{(n=2223, 12)} = 13.003, p = .369$ ), which indicates an excellent fit according to Bentler and Bonett (1980). The RMSEA of 0.006<sub>(0.000-0.023)</sub> and the SRMR of .011 also indicate an adequate fit (Hu & Bentler, 1999; MacCallum et al., 1996). The model explained 5.2% of the variance for parental involvement, 8.0% of the variance for coercion and 12.1% of the variance for overprotection. In this model, the positive associations between irritability and coercion, as well as between fearfulness and overprotection remained significant beyond the contribution of important risk factors (i.e., child sex, birth rank, neonatal health problems, maternal depression, SES). However, the associations previously found between fearfulness and the other parenting measures (i.e., involvement and coercion) were no longer significant after controlling for covariates.

### Discussion

The aim of this study was to investigate prospectively the associations between two aspects of toddlers' negative emotionality and certain parenting dimensions, while controlling for other key risk factors for non-optimal parenting. Two of our four hypotheses were confirmed in both the correlational and SEM path analyses. However, these results are to be interpreted with caution since the percentages of the variance explained by the temperament measures were modest.

First, as predicted, children's irritability was associated to more parental coercion, an externally controlling practice. Our results are therefore consistent with other studies reporting an association between irritability and a more frequent use of coercion (Bridgett et al., 2009; Kiff et al., 2011).

Second, in line with our initial hypothesis, fearfulness was positively correlated to overprotection, an internally controlling practice. This finding is congruent with those of Rubin and al. (1999), who have established that parents of fearful children were less encouraging toward manifestations of independence and with those of Coplan and colleagues (2009) and Hudson and Rapee (2005) who have found that fearful or shy children seem to have more protective parents. We can hypothesize that these parents see their fearful child as more vulnerable when confronted to novelty or insecurity, and are therefore overprotective, in a similar way as parents of children with neonatal health problems (Lengua, 2006; Thomasgard & Metz, 1993, 1997).

Interestingly, our results suggest that parents are at risk of using one of the two types of controlling parenting practices (coercion or overprotection) according to their child's temperament. Parents of more irritable children were found to be more coercive, while parents of fearful children reported being more overprotective, over and above the impact of other significant risk factors. This suggests that different types of controlling parenting would not only have their particular consequences (Soenens and Vansteenkiste, 2010), but also their own respective antecedents, including different aspects of child negative emotionality. Soenens and al. (2010) have established that dependency-oriented control (or overprotection) was usually related to parents' separation anxiety, while performance-oriented control was mostly associated to their perfectionism. However, to

our knowledge, no study had investigated the contribution of different aspects of child temperament when predicting specific forms of controlling parenting, and it could be interesting for future research to replicate these results and investigate the nature of this relation further.

The expected positive relation between fearfulness and involvement has not been found in our study. Instead, we found a marginal *negative* correlation between these two variables, which was no longer significant once these variables were introduced in the model, along with other risk factors for non-optimal parenting. This result is thus inconsistent with those of Lengua and Kovacs (2005) and Van Bakel and Riksen-Walraven (2002), who had both suggested that child fearfulness was associated with higher acceptance and support from parents. The negative relation between child irritability and involvement, found by Van den Boom and Hoeksma (1994), has not been replicated in our study either. In both cases, differences between the measures might be responsible for the conflicting results. While the items measuring parental involvement in the present study referred mostly to positive interactions and participation in parent-child activities, most items used in other studies focused either on emotional support and acceptance, as in the case of Lengua and Kovacs (2005) and Van Bakel and Riksen-Walraven (2002), or on stimulation, physical and visual contact in the case of Van den Boom and Hoeksma (1994). Since fearful children are more sensitive when confronted to novelty, it is possible that parents show more affection and better support in such situations, but do not necessarily initiate and engage in more activities with their children. Low internal consistency on the involvement scale could also partly explain the lack of association between the variables in our study.

### **Limitations and future directions**

The most important limitation of our study pertains to the measures used. Some of the scales showed psychometric weaknesses, such as low internal consistency. In a study such as the QLSCD, an impressive number of variables are assessed, but the scales are often made of a small number of items. It is also possible that some aspects of the studied constructs have not been addressed. For example, there are many caring behaviours that were not included in the involvement scale, which was mostly composed of items about games and activities.

Another limitation was the absence of two important parenting variables, namely structure and autonomy support, which were not assessed in the QLSCD. These measures would have permitted to dress a more complete portrait of the relation between the two subtypes of negative emotionality and parenting practices. In addition, using measures of negative emotionality collected when the child was younger would have been closer and more consistent with the definition of temperament as biologically based and free of environmental influences (Goldsmith et al., 1987; Sanson et al., 2004). Also, the fact that mothers reported on their own parenting is a limitation. The social desirability bias makes it unclear whether their perceptions match reality. Also, maternal depression and SES have been measured at 5 months, which is one year earlier than negative emotionality. Although these measures were likely stable during this period of time (e. g., Ramos-Marcuse et al., 2010; Vliegen et al., 2010), it would have been preferable to measure these constructs at the same time as other predictors. More generally, we have supposed, in this study, that children's temperament influenced parenting. However, this is only one of the many possible directions for the relation between these variables. In previous

research, the opposite direction, the bidirectional relation, and the interaction between temperament and other risk factors have all been suggested (Clark et al., 2000; Kiff et al., 2011; Popp, Spinrad & Smith, 2008; Sanson et al., 2004). Therefore, it is quite possible that the angle taken in this study only poorly represents the complex reality of the parent-child relationship. Future research should therefore consider using cross-lagged analyses to evaluate the strength of the relation between temperament and parenting in both directions. Finally, because parenting was not assessed when the children were 17 months of age, it was impossible to study the change in parenting. In future studies, it would be interesting to examine how different temperament dimensions are related to changes in parenting practices.

Besides addressing the limits outlined above, improvements could be brought to further investigate the temperament-parenting relation by including a larger number of risk factors for detrimental parenting. Future research might want to consider including other potential risk factors such as parental age, culture, personality, values and attitudes, stress level, employment status, social support, marital satisfaction and other psychopathology besides depression (Belsky, 1984; Bradley, 2002; Darling & Steinberg, 1993).

Despite its limitations, this study contributes to the existent body of research on the relation between negative emotionality and parenting because of its considerable strengths, the most important being its sample and the use of multiple informants. First, using data from two different informants for negative emotionality and parenting measures (reported by fathers and mothers, respectively) reduces common method variances. Second, the QSLCD sample is representative of Quebec's population and

facilitates generalization. Third, this study also verifies the hypotheses and validates the results of previous studies within a unique study and sample, which makes it possible to compare results and effect sizes. As such, our study's results suggest that, although child temperament is an important risk factor for controlling parenting, maternal depression and low SES are even more strongly associated to the three measured parenting behaviours, and should therefore be included in future studies investigating the relation between temperament and parenting. Finally, in addition to negative emotionality, five key risk factors for non-optimal parenting were considered in the predictive model, revealing a more precise and realistic account of this complex relation.

Since negative emotionality and non-optimal parenting behaviours are both determinants of child adjustment problems (Sanson et al., 2004), this study opens up further perspectives with regards to the most suitable interventions for at-risk toddlers and their families. Although it is difficult to change a child's temperament, we do have the possibility to build the awareness of parents of irritable and fearful children to the fact that these child characteristics "pull for control" and to teach them how to avoid falling into this trap and act otherwise. By having a better knowledge of the variables which have the greatest negative impact on parenting, it would be possible to increase the resources offered to the concerned families (e.g., maternal depression, low SES, child negative emotionality, etc.). Since the relation between child temperament and parenting has been suggested to be bidirectional (Clark et al., 2000; Lengua & Kovacs, 2005; Sanson et al., 2004), it makes it even more crucial to improve parenting behaviours for the better, especially for parents of toddlers with a negative emotionality, whose temperament already represents a risk for their later adjustment which can be exacerbated



by poor parenting, but who may respond particularly well to optimal parenting practices (Belsky, 1997; Belsky & Pluess, 2009; Kochanska, Kim, Barry & Philibert, 2011; Slagt, Dubas, Deković & Van Aken, 2016).

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Table 1

*Means, standard deviations and bivariate correlations before modeling for all variables included in the study*

Measure	1	2	3	4	5	6	7	8	9	10
1. Fearfulness	-									
2. Irritability	.345***	-								
3. Involvement	-.048 <sup>†</sup>	-.038	-							
4. Coercion	.055*	.129***	-.107***	-						
5. Overprotection	.054*	-.030	.038	.091**	-					
6. Sex <sup>a</sup>	.057*	-.077**	.017	-.128***	-.017	-				
7. Birth rank	.163***	.065*	-.206***	-.011	-.026	.001	-			
8. Neonatal risk	-.031	.010	.049 <sup>†</sup>	.032	.073**	-.080**	-.104***	-		
9. M. depression	.032	.040	-.098***	.205***	.158***	-.009	.056*	.011	-	
10. SES	.030	.067*	.063*	-.169***	-.291***	.029	-.097***	-.034	-.229***	-
<i>M or %</i>	2.076	3.090	3.696	2.016	3.711	51.2 (B)	1.740	.880	1.295	.135
<i>SD</i>	1.520	1.415	.631	.451	2.254	-	.839	1.171	1.237	.959

Note.  $N = 1440$ . <sup>a</sup> child sex: 0 = boy ; 1 = girl. <sup>†</sup>  $p < .10$  \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

